STATE OF NEW HAMPSHIRE
PUBLIC UTILITIES COMMISSION

DOCKET DE 19-057

IN THE MATTER OF: Public Service Company of New Hampshire d/b/a Eversource Energy Petition for Permanent Rates Distribution Service Rate Case

# DIRECT TESTIMONY

OF

Kurt Demmer
Utility Analyst NHPUC

December 20, 2019

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**Introduction**

**Q. Please state your full name.**

**A.** Kurt Demmer.

**Q. By whom are you employed and what is your business address?**

**A.** I am employed as a Utility Analyst in the Electric Division of the New Hampshire Public Utilities Commission (Commission or PUC). My business address is 21 South Fruit St., Suite 10, Concord, NH, 03301.

**Q. Please summarize your education and professional work experience.**

**A.** I graduated from Merrimack College in North Andover, Massachusetts with a Bachelor of Science degree in Electrical Engineering in 1987. In 2002, I received a Master's degree in Electrical Engineering and Power Systems Management from Worcester Polytechnic Institute in Worcester, Massachusetts. Since 1996, I have been a registered professional engineer in the State of New Hampshire.

In June 1988, I joined Massachusetts Electric Company as an Operations Field Engineer. In 1996, I became a Senior Engineer for Massachusetts Electric Company. In 1999, my area of responsibility expanded to include distribution planning engineering. In 2000, I accepted a position as Area Supervisor for the Salem NH area of National Grid USA and was responsible for all distribution engineering, distribution overhead/underground/substation construction, substation operations, and warehousing in the Salem/Pelham area. In 2002, I was promoted to Superintendent of Electric Operations in the Salem/Beverly/Cape Ann Massachusetts area. As Superintendent, I was responsible for distribution engineering immediate oversight, distribution overhead/underground/substation construction, substation operations, and warehousing. From 2003 to 2004, I was a project manager for a 14-mile, $19 million subtransmission 34.5kV underground distribution project consisting of manhole and duct construction housing (1) 34.5kV distribution supply circuit and (1) 34.5kV distribution circuit connecting East Beverly substation to a downtown Gloucester distribution substation. In 2005, as Superintendent of electric overhead distribution operations, I was assigned to the Merrimack Valley district area in Massachusetts. In 2008, I was promoted to Manager of Electric Operations in New Hampshire for National Grid, responsible for the operations, construction, and maintenance functions for the electric distribution organization. In 2010, I was promoted to Acting Director of Electrical Operations in New Hampshire for National Grid. In 2012, I became Director of Electrical Operations in New Hampshire for Liberty Utilities (Liberty). My continued areas of responsibility were to oversee the construction, maintenance, and operation of the electric distribution system. Since 2017, I have been employed as a Utility Analyst in the Electric Division for the Commission.

**Q. What is the purpose of your testimony?**

**A.** My testimony in this proceeding will principally address the Eversource Energy (Eversource) proposal for a multiyear Grid Transformation and Enablement Program (GTEP), the Company’s existing Reliability Enhancement Program (REP), including vegetation management, and the Company’s operational design criteria and procedures.

The first part of my testimony will analyze the GTEP and evaluate the plan based on the Company’s current design standards as well as cost effective requirements for Eversource to provide safe and reliable electric service at reasonable rates. In addition to the GTEP operational and cost evaluation, a needs assessment for the program will also be evaluated. In the design and operational assessment, design criteria or strategies that have been adopted by the Company since the 2015 LCIRP filing[1] will be assessed as to the applicability to the New Hampshire service territory in the GTEP proposal.

The second part of my testimony will evaluate Eversource's recent reclassification[2] of vegetation activities and the Company's proposal of vegetation activities going forward. Discontinuation of capital REP investments, a smaller portion of the 2018 and 2019 REP plans, will be discussed as part of the overall base reliability plan.

The third part of my testimony will focus on the Company's reliability indices and performance from 2007 to present as it relates to the reporting of those indices, both internally within the Eversource service territory and externally to entities such as EEI, IEEE, or the NH Commission.

The final part of my testimony address municipal street lighting installation and maintenance.

**Q. Have you previously testified before the Commission?**

Yes. I have previously testified before the Commission while I was an employee of Liberty, and more recently, I have testified in Docket No. DE 19-111, Annual Stranded Cost Recovery and External Delivery Charge Reconciliation and Rates.

## GTEP Analysis

**Q. Please provide an overview of Eversource's GTEP plan**

[1] Order No. 26,050, Docket No. DE 15-248
[2] Order No. 26,206, Docket No. DE 18-177. Eversource reclassified vegetation management activities as expense for 2019 and future filings.

**A.** The company's GTEP plan initially filed in DE 19-057 was presented in two parts. The first part includes: a 10 year accelerated replacement plan for 50,000 poles that are 50 years or older; Right of Way (ROW) reconstruction and reconductoring of 10-20 miles of off road circuits per year; and the replacement of substation oil filled circuit breakers (OCB) for an accelerated completion from nine years to seven years.

The second part of the GTEP initially filed included two projects that Eversource included to demonstrate operating and clean energy benefits for customers. The two projects are the Westmoreland Clean Innovation (battery storage) Project and the Oyster River Clean Innovation (microgrid) Project. After the initial Technical Session held on June 21, 2019, the Company learned that Commission Staff, the Office of Consumer Advocate ("OCA"), and other interveners prefer that the Commission's review of the merits of the Projects be conducted in a separate process, outside of the rate case, Docket No. DE 19-057.[3] The Company withdrew the two demonstration projects in Docket DE 19-057 for future submittal and reconsideration.

**Q. Please provide in more detail the Company's GTEP proposal for accelerated pole replacement.**

**A.** Presently there are approximately 276,000 distribution wood poles located in Eversource's custodial maintenance service territory.[4] The GTEP targets approximately 50,000-55,000 distribution wood poles, older than 50 years old, for replacement over a 10-year span. There

[3] Attachment KFD-1. Docket No. DE 19-057, Letter from Eversource to PUC Commission dated 7/31/19.
[4] The majority of wood distribution poles are joint owned between Eversource and either Consolidated Communications or TDS Telecommunications Inc. The utility with custodial maintenance performs the interval inspection and replacement of the pole.

are approximately 50,000-55,000 poles, presently located in Eversource's custodial maintenance service territory that meet this age criteria.

Without GTEP, Eversource would replace approximately 1000 poles per year. Annually, through an invasive inspection process, approximately 500 of the 1000 poles are replaced due to failure in providing adequate structural strength that is required for the weight of the pole attachments and the wire tension needed to provide specified clearances for public and lineworker safety. Under GTEP, Eversource would install an additional 4,000 poles per year at an incremental cost of $25,000,000 ($20,000,000 capital, $5,000,000 O&M expense) for 10 years. In order to eliminate the 50,000-55,000 poles older than 50 years, Eversource proposes to spend approximately $200,000,000 in capital and $50,000,000 in O&M expense. This would be in addition to the $50,000,000 in capital to perform typical reject pole replacements, 1000 per year, over the next 10 years.

**Q. How does Eversource or other custodial utilities determine that a wood pole needs replacement?**

**A.** This is accomplished through an invasive pole inspection activity that is performed on the 10% of the pole population (approx. 27,000 poles) per year (a 10-year cycle). The requirement for this inspection is based on internal Company procedures, Commission Puc 300 rules, and Intercompany Operating Procedures (IOPs) between the two joint pole owners.[5]

**Q. Are there other methods that may be used to determine that a pole should be replaced?**

**A.** Yes. In addition to the invasive pole inspection procedure, there are other methods, such as a field inspection outside the inspection cycle, that may determine the pole is subpar in column

[5] Attachment KFD-2., Eversource Energy TD953 Procedure Rev.7 updated 11/8/2017 " Inspection, Treatment, Restoration, and Replacement Guidelines for Distribution System Wood Poles" ; Puc Rule 306.01; Puc Rule 306.02

strength and requires replacement. These type of assessments are utilized and would add approximately another 500 poles to the 500 poles replaced after invasive inspection. On an annual basis, using these two methods, Eversource typically replaces approximately 1000 poles.

**Q. Is Staff aware of the Company procedures and policies when assessing these investments?**

**A.** Initially no. Staff requested, via email on 11/5/18, all operational and design documents for the Company's distribution operational requirements which range from field operations to design criteria. Eversource provided Staff an extensive list of policies, procedures, and documents. All of the documents were received on July 18, 2019. After a DE 19-057 technical session held on September 5 and 6, 2019, Staff requested Eversource's Distribution System Engineering Manual (DSEM) because Staff was unaware that there were additional engineering documents that were utilized in Staff Response 10-25 dated August 27, 2019.[6] The DSEM was sent to Staff on September 11, 2019. Attachment KFD-3 includes the two emails and a list of Eversource policies and procedures that were provided to Staff.

**Q. The poles that are targeted in GTEP are older than 50 years, which is greater than their depreciated life. Should those poles be replaced on their age?**

**A.** No. An asset's field lifespan is not dictated by the asset's book value. As part of least cost planning and cost effective pole asset replacement, periodic asset evaluation and maintenance is required to proactively address possible unplanned failure of the asset. In addition, replacement of the asset should reflect either the present need of the asset or a known short-term future need. In this case, 10% of the company's custodial pole population is inspected,

[6] Attachment KFD-3, Docket No. DE 19-057, Email correspondences dated 11/5/18 and 9/11/19, List of Eversource Policies and Procedures provided by Eversource dated 2/13/19.

every 10 years, utilizing an invasive inspection on the pole per the Company's inspection procedure[7]. Moreover, as line crews, supervisors, and engineers interact with these assets during storm restoration, day to day service calls, or periodic line inspections, visual inspections are also being performed. Premature replacement prior to the asset being evaluated as not meeting the threshold as specified in the inspection procedure does not provide any additional benefit.

**Q. What are some of the concerns that Staff have with the GTEP pole replacement proposal?**

**A.** Staff is concerned with a number of issues in the accelerated replacement of 50,000-55,000 poles in the Eversource custodial service territory.

The proposal is to replace all poles more than 50 years old, regardless of existing structural condition. As stated earlier in my testimony, age of an asset or the book lifespan is not necessarily a deciding factor in asset replacement. The company stated that "the Company will prioritize poles for replacement based primarily on age, condition, location, and number of customers served by the circuits on the poles."[8]. Although the Company may prioritize the replacement of identified reject poles on location or number of customers served (i.e. reliability impact), the prioritization of replacement based on age conflicts with Eversource's inspection program. An inspection program, by its definition, is an attempt to identify structural defects based on an industry best practice, for example, by boring and sounding poles. This activity is conducted on a 10-year cycle, which is more frequent inspection cycle

[7] Attachment KFD-1
[8] Docket No. DE 19-057. Testimony of Joseph A. Purrington and Lee Lajoie, dated 5/28/19, Bates page 441, lines 3-5.

than what is stated for Connecticut and Western Massachusetts in the Company's TD 953 Procedure Rev.7 updated 11/8/17.

The Company also stated that, "[a]lthough there are reliability benefits from accelerating pole replacement, the biggest impact will be the greater integrity and resiliency of the system through a range of weather events. For example, in recent years it has not been unusual for hundreds of poles to be damaged in a single weather event. The new poles that PSNH is installing are physically larger and stronger and have the potential to withstand more extreme weather conditions as compared to smaller 50-year old poles."[9].

In a recent Technical Session, Staff inquired how many poles were replaced during the October 2019 Wind Storm. This was the most recent storm, and Staff expected that the Company would have a heightened sensitivity to a large event such as this windstorm. In addition, the windstorm would be similar to an event that the Company is referring to in its testimony for GTEP investments for storm resiliency. The company's response[10] stated that 59 poles were broken in the event. Wind, trees, or tree limbs were the causal factors in the broken poles. In addition, in response to a data request, the Company stated that it does not track the type or class of poles that are replaced. If the Company is not tracking the size and class of the pole that it is replacing during a major event, the Company cannot correlate the size of the pole and its age with the damage to the pole during the storm event. Numerous other factors may affect the analysis; if it were a tree, how large was the tree, was the pole in Eversource custodial area, was the pole already identified as a pole inspection reject, etc.

[9] Docket No. DE 19-057. Testimony of Joseph A. Purrington and Lee Lajoie, dated 5/28/19, Bates page 441, lines 10-15.
[10] KFD-4, Docket No. DE 19-57, Eversource Response Staff TS 2-48.

Staff also asked the Company to provide a cost effective analysis, business case, or other means of justifying the increased cost for all of the GTEP investments, including the accelerated pole replacement. Attachment KFD-4 indicates that the Company did not perform a cost effective analysis for any of the GTEP investments, including the accelerated pole replacement proposal. Instead, the Company recited that the GTEP investments are asset condition based and will be prioritized on level of condition and reliability impact. Staff agrees that asset condition such as a typical one for one wood pole replacement does not require a cost benefit analysis to replace; however, the basis for that decision is evidenced based from an inspection result indicating a structural or safety concern.

**Q. Are there other items to consider for the accelerated pole replacement proposal in GTEP?**

Yes. The additional 4000 poles per year would increase the reject pole replacement to 5,000 poles per year. Unintended consequences for this accelerated replacements include: (1) significantly greater amount of double poles in Eversource's custodial maintenance area; (2) significantly higher costs to either TDS or Consolidated Communications as the telecommunications utility (ILEC) would be responsible for a fixed cost per pole replacement and any cost required to transfer telecommunications assets to the new pole pursuant to the established Intercompany Operating Procedures (IOP);(3) possible significant pushback from the ILEC joint owner because poles are being replaced based on age rather than a prescribed process such as what is established in IOP #7; and (4) third party providers (e.g. Comcast) incurring additional pole transfer costs due to accelerated and premature pole replacements. Although these costs and considerations are separate from electric rate impacts, they demonstrate that additional costs to customers through significantly higher pole capital replacement is not an isolated impact. Consolidated Communications or TDS, as well as third party providers may increase their service rates to offset the increased cost of this accelerated pole replacement over 10 years.

**Q. What is staff's recommendation for the accelerated pole replacement proposal in GTEP?**

**A.** The Company has not performed or presented any cost benefit analysis or business case that would provide Staff the reliability or resiliency quantifiable benefit information Staff needs to support the additional costs in this proposal.

**Q. Please provide in more detail the Company's GTEP proposal for ROW and roadside reconstruction**

**A.** The Company is proposing an accelerated investment in reconstructing or relocating existing lines that are currently in the Company's ROW. The Company is proposing to increase the annual capital spend by approximately $15,000,000, and the annual O&M expense by approximately $750,000. Without the additional investment proposed in the GTEP, the Company is already investing $10,700,000 on an annual basis for ROW reconstruction and reconductoring in 2020-2024. As a result, total spending for that activity is estimated by the Company to be $26.6M per year.

The objective of the reconstruction and reconductoring is to relocate lines that are presently in the ROW with limited access to the street for better access. Many of these lines are distribution three phase circuits.

**Q. What are some of the concerns that Staff have with the GTEP ROW reconstruction and replacement proposal?**

**A.** Two items in the proposal need to be addressed. The first is the present capital investment the Company is proposing to install outside the GTEP initiative. Similar to other reliability initiative projects, the Company bears the burden of proving that the reconstruction and reconductoring of these ROW circuits is necessary and will provide the reliability benefits required to justify the significant capital investment. The second is the acceleration portion of this GTEP initiative. Presently Eversource has one of the lowest SAIDI and SAIFI metrics that the Company has experienced since 2007. The Company has not experienced any significant reliability issues with the existing ROW circuits. The relocation on the street ROW for some of these circuits may not be necessary due to the significant ROW widening and maintaining that the Company has performed over the past 5 years. Moreover, relocation of existing assets to the street could create additional pole assets or space constraints in the public ROW if there are already significant distribution assets already present in the public ROW.

Staff asked about the Company's statement regarding the reconductoring of undersized wire in testimony. "The Company estimates that approximately 80 percent of the 600 miles of off-road lines are constructed with undersized bare wire that will need to be upgraded for resiliency and to prepare the grid for integration of advanced energy solutions." In Attachment KFD-5[11], OCA inquired about the level of resiliency and how the upgraded wire will enable the integration of advanced energy solutions. The Company responded that "[t]here is no in-depth analysis that is needed to demonstrate that the upgraded wire will improve resiliency; and no available, accepted or feasible method for quantifying what that improvement would be."

[11] Attachment KFD-5, Docket No. DE 19-057, Eversource to OCA Response 6-53.

In order to assert that a measure will create improvement, there first needs to a base value by which improvement is measured.. If resiliency cannot be measured, how does the Company know that the investment will be prudent and the benefits outweigh the investment costs?

**Q. What is staff's recommendation for the ROW reconstruction and reconductoring proposal in GTEP?**

**A.** The ROW reconstruction and reconductoring proposal in GTEP and outside of GTEP requires a cost benefit analysis and measureable reliability benefits. Replacing existing wire that is sufficient for loading concerns for resiliency and reliability reasons need to be quantified. Since resiliency and reliability improvements for wire considered undersized by the company has not been quantified, Staff cannot support this initiative whether it is part of the GTEP initiative or part of the proposed capital plan for 2020-2024.

**Q. How does the Company justify its proposal under the GTEP to accelerate substation renewal through replacement of its Oil Circuit Breakers (OCBs)?**

A. The Company has justified accelerated replacement of their OCBs primarily by asserting that they: (1) have failed resulting in widespread outages; (2) are costly to maintain; (3) may result in costly environmental damages upon failure; and (4) are in excess of 40 years old. Each of these assertions is examined below.

The Company has suggested oil circuit breakers require accelerated replacement because they are "[T]he cause of some widespread outages in the past, when the breakers failed to operate as quickly as intended."[12] However, when asked to identify any widespread outages caused by oil circuit breakers in the past five years, the Company acknowledges that over the past 14 years, there have been no widespread outages associated with oil circuit breakers.[13]

[12] Docket No. 19-057 Testimony of Joseph A. Purrington and Lee Lajoie, Bates 400, Lines 10-12.
[13] Attachment KFD-6, Docket No, DE 19-057 Eversource Response to OCA 6-37.

The Company was able to describe two oil circuit breaker failures that occurred at a single substation in Laconia during 2005 where 25,000 customers lost power; however the root cause of the outage was not provided. A single outage caused by an oil circuity breaker in in 15 years does not necessitate the magnitude of accelerated investment described in the GTEP program.

The Company has suggested oil circuit breakers require accelerated replacement because "Some of these older breakers also have bushings containing oil with high levels of polychlorinated biphenyls (PCBs)," and that "[f[ailure of some of these bushings have resulted in extensive and costly cleanup efforts."[14] However, when asked to identify any cleanup efforts and the relevant costs associated with OCB bushing failures, the Company was unable to provide an example specific to OCBs, and instead cited an event relating to a Potential Transformer.[15]

The Company has suggested that one of the benefits of replacing OCBs is that the maintenance costs of vacuum circuit breakers is lower than the maintenance costs associated with OCBs.[16] However, when asked to compare the maintenance costs of the two pieces of equipment, the Company acknowledged that"[a]pproximate costs over the 12-year cycle are over $11,000 for oil circuit breakers and around $3,200 for vacuum breakers."[17] In light of the fact that cost of replacing an OCB is approximately $500,000,[18] the maintenance savings of approximately $650/year does not support accelerated OCB replacement.

[14] Docket No. 19-057 Testimony of Joseph A. Purrington and Lee Lajoie, Bates 400, Lines 13-14
[15] Attachment KFD-7, Docket No. DE 19-057 Eversource Response to OCA 6-38.
[16] Docket No. 19-057 Testimony of Joseph A. Purrington and Lee Lajoie Bates 400, Line 15
[17] Attachment KFD-8, Docket No. DE 19-057 Eversource Response to OCA 6-39.
[18] Attachment KFD-9, Docket No. DE 19-057 Eversource Response to OCA 6-64.

The Company has suggested oil circuit breakers require accelerated replacement because "[a] significant number of the Company's oil circuit breakers (OCBs") are in excess of 40 years old."[19] However, only approximately 30 of the Company's approximately 100 OCBs appear to be beyond the expected useful life of 55 years for items such as the OCBs, which recorded in FERC account 362.[20] Replacement of high cost items before the end of their useful life should only occur when adequate justification is provided. Based on the facts discussed above, such justification has not been provided. Therefore, the Company should not accelerate its OCB replacement beyond that which is already planned within its base capital budget.

**Q. What is Staff's conclusion regarding the proposal under the GTEP to accelerate substation renewal through replacement of its OCBs?**

**A.** The Commission should deny recovery of the Company's proposed substation renewal program. This program would accelerate replacement of OCBs which have not been a major cause of outages, have not failed resulting in environmental damage, have minimal maintenance costs, and on average have not yet reached the end of their expected useful life.

**Q. Are there other staff concerns surrounding some of the ongoing capital investments `made by the Company on typical distribution construction?**

Yes. There are multiple investments that the company has made over the past 3 years as part of their resiliency guidelines which staff was unaware of until the DE 19-057 testimony was presented. These investments appear to be part of Eversource (parent company) adopting a company-wide initiative for distribution resiliency. For example, the storm resiliency guideline relates only to Connecticut and Massachusetts, and originated in an order adopted

[19] Docket No. 19-057 Testimony of Joseph A. Purrington and Lee Lajoie, Bates 400, Lines 3-6
[20] Attachment KFD-10, Docket No. DE 19-057 Eversource Response to OCA 6-36.

by the Connecticut utility regulator. It appears that the proposed use of the Connecticut and Massachusetts standard in New Hampshire is driven not by a business case, but by a desire to have uniform standard across the Eversource system.

Q. **Please explain your concerns as they relate to wood pole replacement.**

A. In the testimony of Messrs. Purington and Lajoie, it states that when the Company replaces poles of any class and height, the standard going forward will be to replace all poles in the public ROW with a minimum Class 2 pole. Prior to this change, the Company standard pole was a 40-ft. Class 4 pole. The reason behind the change is driven by claimed resiliency benefits. The cost difference between a Class 4 pole and a Class 2 pole is approximately $75 more for the Class 2 pole. The Company has stated a 50% increase in pole strength due to the new Class 2 standard; however, since the standard pole was a Class 4 pole and that standard was driven by actual field conditions (weight of the attachments, wire tension, and guying) and calculated by distribution design engineer, the additional strength of the new standard Class 2 pole is excessive and not justifiable.

Q. **Does staff have similar concerns as they relate to other pole top equipment.**

A. Yes. Another pole top equipment standard that is being adopted by Eversource NH is the composite crossarm. This fiberglass crossarm is used in place of a wooden crossarm that was a standard in New Hampshire previous to the new DSEM resiliency and reliability guidelines. The fiberglass crossarm structural strength compared to a wooden crossarm is excessive for a majority of the distribution construction design presently on Eversource's street distribution circuits. The cost difference between a wood crossarm and a composite crossarm is approximately $65 higher for the composite crossarm.

Q. **Does staff have any other pole construction concerns that would apply to other circuit locations?**

**A.** Yes. For ROW circuit applications, mainly backbone or mainline circuit locations, the Company has changed their standard to light-duty steel poles instead of wood poles in the ROW. The Company has stated that the lighter steel poles have twice the life of a comparable wood pole (90 years compared to 45 years) and are not susceptible to insect or woodpecker damage. The Company has stated increased resiliency benefits with the installation of the light-duty steel poles. Staff is concerned that similar to the Class 2 pole, theCompany is installing an asset that is higher in cost and has increased strength that is redundant and will not be utilized. The cost of a 40-ft. Class 2 pole is $899. A light-duty Class 1 steel pole is $2152, or $1253 additional cost. There are additional costs with a light duty steel pole in the ROW. The basic impulse level (BIL) needs to be raised to 300kV rather than the 200kV on the wooden pole. This higher BIL translates into additional insulators on the structure therefore increasing costs higher for the light-duty steel pole installation.

**Q. What is staff's recommendation for the resiliency based investments that are proposed in this docket DE 19-057?**

See Attachment KFD-6. Staff had requested the Company for any business case or cost benefit analysis to be provided with the above resiliency proposals. The Company said it had not conducted any cost benefit analysis or business case for these investments. Therefore, staff cannot support the installation of these investments without quantifiable benefits and recommends the Commission deny these future investments as they are presented in this docket. The Company has the burden of justifying the increased expenditure that provides little to no measureable benefits, even if the Company cites a standardization requirement.

**Q. In light of Staff's recommendation for the Commission to deny recovery of future plant additions for the aforementioned proposed investments, does Staff have any recommendation regarding plant additions already installed which also may not comply?**

**A.** Yes. Staff recommends that the Commission order the Company to work with Staff to identify any plant additions from years 2018 through 2020 that do not comply with the above, and fully identify additional costs of plant additions for this timeframe. Staff also recommends the Commission order that a Staff recommendation be filed by December 31, 2020 regarding any additional costs for the Commission's consideration.

**<u>Vegetation Management</u>**

**Q. What is Staff's assessment of the company's vegetation management program?**

**A.** The company's approximately 12,200 miles of distribution overhead lines vegetation management presently consists of multiple vegetation activities which fall into different budget classifications. Although there are multiple activities associated with vegetation management, Staff will concentrate on four areas of vegetation management; Scheduled Maintenance Trimming (SMT), Enhanced Tree Trimming (ETT), Full width ROW clearing (ROW), and Enhanced Hazard Tree Removal (ETR).

First, SMT follows an established trim cycle of approximately 4.5 years. The average miles per year for SMT is approximately 2500 miles.

Second, ETT is performed on the backbone or the mainline of the circuit and worse performing feeder based on SAIDI performance are chosen for ETT with a target of approximately 150 miles of circuit backbone trimmed to expanded clearances beyond the typical SMT clearances (8 feet to the side, 15 feet above, and 10 feet below). There are occasions where a poor performing circuit will be scheduled for SMT and will receive ETT within the same timeframe.

Third, full width clearing involves full-width ROW clearing. This clearing includes a clearing of trees and brush up to the full width of the right of way easement or property lines.

Fourth, hazard tree removal involves the identification, and complete removal, of trees determined to be a reliability impact to the distribution lines, both within and outside standard trimming zones.

The Company is requesting the following budget going forward[21]:

| Public Service Company of New Hampshire dba Eversource Energy<br>DE 19-057<br>Staff Data Requests - Set #1; Question 1-3<br>2009 - 2018 Annual Spending and 2019 Budget | | | | | |
|---|---|---|---|---|---|
| | **2019 Forecast** | **2020 Forecast** | **2021 Forecast** | **2022 Forecast** | **2023 Forecast** |
| **O&M - Total** | **31,079,577** | **32,732,964** | **33,714,953** | **34,726,402** | **35,768,194** |
| Base - Total | 14,979,577 | 15,428,964 | 15,891,833 | 16,368,588 | 16,859,646 |
| SMT | | | | | |
| METT | | | | | |
| Hot Spot | | | | | |
| Mid-Cycle | | | | | |
| | | | | | |
| REP - Total | 16,100,000 | 17,304,000 | 17,823,120 | 18,357,814 | 18,908,548 |
| ETT | 5,000,000 | 5,150,000 | 5,304,500 | 5,463,635 | 5,627,544 |
| ETR | 10,000,000 | 10,300,000 | 10,609,000 | 10,927,270 | 11,255,088 |
| ROW | 1,100,000 | 1,854,000 | 1,909,620 | 1,966,909 | 2,025,916 |

[21] Attachment KFD-11, Docket No. DE 19-057, Eversource Response to Staff TS 2-31.

Staff has analyzed the reliability data for Eversource using SAIFI[22] data rather than SAIDI[23] data for tree circuit performance. SAIFI is a more common tool for circuit design assessment as it is not time based, but rather impact based. Utilizing or prioritizing tree performance under SAIDI criteria can still be utilized as a second level decision tool or validation for tree based reliability enhancements but unless the resource and geographic parameters are uniform, the SAIDI data can inflate or reduce a circuits tree performance. This is due to crew response which can be largely dictated by time of day, day of the week, number of crews that are on the property that day, or if there are concurrent outages occurring at the same time. The same location may experience different crew restoration times and therefore change the SAIDI of the tree related event month to month or year to year.

Staff analyzed the tree related system SAIFI performance from 2009 to 2018[24].

Docket No. DE 19-057
Data Request TS 2-033
Dated 11/01/19
Attachment TS 2-033

NHPUC Data Request - 2009 - 2018 - NH Tree Related - IEEE Criteria

| Year | SAIDI | SAIFI |
|---|---|---|
| 2009 | 56.94 | 0.4826 |
| 2010 | 108.69 | 0.7518 |
| 2011 | 85.25 | 0.6482 |
| 2012 | 79.38 | 0.6024 |
| 2013 | 75.85 | 0.5524 |
| 2014 | 61.81 | 0.5822 |
| 2015 | 57.23 | 0.5517 |
| 2016 | 82.53 | 0.7297 |
| 2017 | 77.12 | 0.5994 |
| 2018 | 70.25 | 0.5197 |

[22] SAIFI is the System Average Interruption Frequency Index.- the number of outages an average customer experiences.
[23] SAIDI is System Average Interruption Duration Index - the average duration of outage the average customer experiences annually.
[24] Attachment KFD-12, Docket No. DE 19-057. Eversource Response to Staff TS 2-33.

Although there was a change in the OMS system in 2015, a system level of tree related SAIFI and SAIDI was available for analysis for all 10 years.

- The average SAIFI for the 10 years is 0.602.
- The average SAIDI is 75.5 minutes.
- 2018 SAIFI performance is 0.08 less than the 10 year average.
- 2018 SAIDI performance is 5.25 minutes less than the 10-year average.

The average cost per mile for SMT for 2016 through 2018 is $5,235/circuit mile.[25]

The average cost per mile for ETT for 2016 through 2018 is $42,644/circuit mile.[26]

Since 2009, there have been at least two cycles of SMT performed on the Eversource distribution system. The ETT, however has not been completed, only completing approximately 1085 miles of backbone circuit or 67% of the total 1600 miles of backbone on the Eversource distribution system.

Considering that ETT was performed on the worse performing circuits for the past 10 years, there should be an expectation of SAIFI or SAIDI performance as more of the system had ETT performed.

There is little to no evidence of overall SAIFI or SAIDI performance as the ETT activity progressed. Moreover, the expense per mile of ETT, which is approximately 8 times that of SMT, creates a very high cost per SAIFI improvement or $ per ΔCI. The SMT program is designed to provide a maintenance function to the tree contribution in reliability performance. In other words, one would expect that SMT would maintain the system reliability.

[25] Attachment KFD-11, Docket No. DE 19-057, Eversource Response to Staff TS 2-31
[26] Attachment KFD-11, Docket No. DE 19-057, Eversource Response to Staff TS 2-31

The non-discernable performance improvement of ETT for system reliability is part of the issue with continuing to perform ETT on backbone circuits. Another issue is the contribution that Eversource receives from the joint owner, Consolidate Communications or TDS. Per the IOP, Eversource performs all tree trimming activities including SMT and ETR. The ILEC is responsible for reimbursement to Eversource for those activities. Eversource, however cannot be reimbursed for part of the ETT activity as ETT is not defined in the IOP agreement. This presents an issue if the circuit that is scheduled to have SMT performed, has ETT performed on part of the circuit. The portion of the circuit where ETT is displacing SMT , does not receive any contribution from the ILEC. The amount of contribution not collected can be significant. See Attachment KFD-13[27]. The contributions not collected from the ILEC due to ETT is $236,620 since 2015. This demonstrates another reason why ETT should not be performed.

**Q. Did Staff assess other activities in the company's vegetation management program?**

**A.** Yes. The ETR activity was also analyzed similar to the ETT program. ETT is presently performed on both three phase and single phase circuits with an internal prioritization applied in order to maximize reliability benefits. The Company has requested $10,000,000 going forward in 2020 for ETR funding. Staff analyzed the cost benefit ratio of performing ETR on single phase vs. three phase ETR. These tables are derived from Eversource response to Staff Data Request TS 2-33.

[27] Attachment KFD-13, Docket No. DE 19-057. Eversource Response to Staff 12-40.

| NHPUC Data Request - September 13 2015 - 2018 - NH Tree Related - IEEE Criteria - Single Phase Devices | | | |
|---|---|---|---|
| Year | Phase_IND | SAIDI | SAIFI |
| Sep 13 -YE 2015 | 1_PH | 7.25 | 0.06 |
| 2016 | 1_PH | 37.15 | 0.26 |
| 2017 | 1_PH | 36.42 | 0.25 |
| 2018 | 1_PH | 33.98 | 0.26 |

| a.iv - September 13 2015 - 2018 - Single Phase By Trim Zone - IEEE Criteria | | | | |
|---|---|---|---|---|
| Year | Phase_IND | TRIM_ZONE | SAIDI | SAIFI |
| Sep 13 -YE 2015 | 1_PH | Inside Zone | 0.14 | 0.0014 |
| 2016 | 1_PH | Inside Zone | 0.28 | 0.0028 |
| 2017 | 1_PH | Inside Zone | 0.42 | 0.0042 |
| 2018 | 1_PH | Inside Zone | 0.58 | 0.0060 |
| | | | | |
| Sep 13 -YE 2015 | 1_PH | Outside Zone | 7.11 | 0.0569 |
| 2016 | 1_PH | Outside Zone | 36.86 | 0.2577 |
| 2017 | 1_PH | Outside Zone | 36.00 | 0.2491 |
| 2018 | 1_PH | Outside Zone | 33.40 | 0.2507 |

| NHPUC Data Request - September 13 2015 - 2018 - NH Tree Related - IEEE Criteria - Three Phase Devices | | | |
|---|---|---|---|
| Year | Phase_IND | SAIDI | SAIFI |
| Sep 13 -YE 2015 | 3_PH | 7.21 | 0.1065 |
| 2016 | 3_PH | 42.92 | 0.4561 |
| 2017 | 3_PH | 35.40 | 0.3270 |
| 2018 | 3_PH | 32.89 | 0.2494 |

| a.iv - September 13 2015 - 2018 - Three Phase By Trim Zone - IEEE Criteria | | | | |
|---|---|---|---|---|
| Year | Phase_IND | TRIM_ZONE | SAIDI | SAIFI |
| Sep 13 -YE 2015 | 3_PH | Inside Zone | 0.59 | 0.0084 |
| 2016 | 3_PH | Inside Zone | 1.60 | 0.0441 |
| 2017 | 3_PH | Inside Zone | 1.51 | 0.0140 |
| 2018 | 3_PH | Inside Zone | 0.38 | 0.0053 |
| | | | | |
| Sep 13 -YE 2015 | 3_PH | Outside Zone | 6.62 | 0.0982 |
| 2016 | 3_PH | Outside Zone | 41.32 | 0.4120 |
| 2017 | 3_PH | Outside Zone | 33.89 | 0.3130 |
| 2018 | 3_PH | Outside Zone | 32.51 | 0.2441 |

Staff made the following high level assumptions in the analysis.

- There is a uniformity of hazard tree occurrence between single phase and three phase.

- Hazard tree locations and density are uniform between single phase and three phase.
- Outages that occur from tree contact that initiated within the tree clearance zone (inside zone) is attributable to normal sideline growth or overhang within the clearance zone. This issue is generally related to SMT efficiency.
- Outages that occur from tree contact that initiated outside the tree clearance zone (outside zone) is attributable to hazard tree contact. Either a piece of the tree or branch failed outside the normal trim zone.
- Approximately 95% of the SAIFI contribution is from the outside zone tree related contact.
- Distribution system lateral vs backbone (mainline) [28]
    - 12,200 miles of overhead distribution circuits
    - 3,000 miles of road-side, three-phase distribution circuits
    - Approximately 17 percent of the distribution system is considered backbone
    - Approximately 83 percent of the system consists of overhead laterals stemming off backbone circuits.

Utilizing the last 4 years of SAIFI, the three phase averaged 0.2668, the single phase averaged 0.2036.

Three phase outside trim contributes to approximately 57% of the total outside trim SAIFI.

The annual spend of 10,000,000 in hazard tree removal will be utilized on the circuits which 17% of the circuits are backbone and contribute to 57% percent of the total outside SAIFI.

[28] Docket No. 19-057 Testimony of Joseph A. Purrington and Lee Lajoie, Bates 397, Lines 4-9

Therefore approximately $1,700,000 of the $10,000,000 budgeted will contribute to over half of the SAIFI metric.

**Q. The Company included the $1.2 M ILEC contribution that was unpaid in 2018/2019 as part of the reconciliation and O&M recovery. Does Staff agree with that position?**

**A.** Staff does not. The contributions that have been agreed to per the Intercompany Operating Procedures (IOP) should be reflected in the reconciliation as if the ILEC had paid the Company the full amount owed. The Company has other legal avenues to collect the debt from the ILEC and those avenues should be exhausted prior to requesting the amount from customers. If the Company is made whole without going through the legal options that are available, there is no incentive to the Company to advance further with legal action. If there is an IOP business process issue, the Company should address that issue immediately. Recovery of the debt owed will not incentivize the Company to address the issue in a timely manner.

**Q. What is Staff's recommendation for the vegetation management activities going forward?**

**A.** Staff recommends that the Company continue to perform certain base O&M activities as performed pre-2019. These include scheduled maintenance trimming (SMT), scheduled maintenance for previously enhanced tree trimming (METT), mid-cycle trimming, hot spot and trouble trimming, and ROW maintenance mowing and side trim. The Company requested $14.97M for 2019 with an escalating 2-3% increase in budget to 2023. Staff recommends an annual budget of $14.8M for the above vegetation activities. This is derived from the average of the budgeted amount from 2016 thru 2018.[29]

[29] Attachment KFD-14, Docket No. DE 19-057. Eversource Response to OCA 1-51

The Company requested $16.8 annually to be in base O&M for the following vegetation activities: ETT-$5M , ETR - $10M , Full Width ROW Clearing - $1.8M

Staff agrees that there are reliability and operational benefits for a limited ETR and full width ROW clearing, however Staff does not recommend the continuation of ETT. The lack of evidence of reliability benefit to high cost implementation is the primary reason. Secondary was the absence of ILEC contributions that should be in line with ETT claimed benefits.

Staff also recommends the reduction of ETR cost with a focus on three-phase backbone or mainline hazard tree removal. The reliability benefits a significantly greater with mainline hazard tree removal utilizing less $ per ΔCI.

Therefore Staff recommends an annual budget for the following additional vegetation activities: ETT - $0,  ETR – $2.5M , Full Width ROW Clearing - $1.8M

In addition, Staff recommends that all billed ILEC contribution should be deducted from the Company's SMT and ETR spend used for calculating annual reconciliation.

**Q. The Company has performed ETT since 2009. Why is Staff now recommending a discontinuation of the program?**

**A.** Initially in 2009, Staff was concerned with the Company's vegetation management focus and declining reliability indices. The Company has significant historical tree related data to allow for further analysis on cost effectiveness in each of the vegetation activities. With the increasing cost of the ETT program, Staff has utilized the extensive duration of reliability data to analyze the cost effectiveness of this program and has recommended the discontinuation based on little to no improvement of tree related SAIFI over the past 10 years.

**<u>Reliability Indices</u>**

**Q. What is Staff's concern with the present reliability reporting performed by the Company?**

**A.** During the Staff docket investigation, it was apparent there were two reporting issues in the Company's external reporting to the Commission.

The first issue was a clarification issue. The IEEE critieria presented by the Company in the Puc E-38 filings had an incorrect last page to the report. The page is a definition of reliability indices and terms. Listed were the types of outages that were not included in the reliability data presented to the Commission as IEEE-1366. The IEEE criteria has a smaller set of exclusions which the last page erroneously stated. The Company has corrected the issue reporting going forward will reflect a modified last page.

The second issue arose when Staff inquired about the PUC exclusionary events. The PUC defined reliability metrics differ from the IEEE reliability standard. The PUC reliability metric is Company and NH State specific. It lacks the standardization the regulator needs to compare reliability metrics between utilities in NH and in other states. This standardization is the reason why the Commission decided to report only IEEE in the PUC E-38 reports.

See Attachment KFD-15[30], Staff requested a breakdown of causal factors that are considered miscellaneous or "other" in normal reporting. After reviewing the data, Staff noticed a sharp increase in planned outage reporting from 2015 to 2019. Staff inquired further in Staff request TS 2-41. See Attachment KFD-16[31] . Staff requested the Company explain in further detail the incident that was reported as a planned outage. It was apparent that Staff

[30] Attachment KFD-15, Docket No. DE 19-057. Eversource Response to Staff 15-14
[31] Attachment KFD-16, Docket No. DE 19-057. Eversource Response to Staff TS 2-41

was not following its internal planned outage policy[32] that was provided to Staff in January 2019 in Docket DE 19-017.

**Q. What is Staff's recommendation?**

**A.** Staff recommends that this issue be addressed in Docket DE 19-017. The issue of planned outage notification and reliability reporting will need to be investigated further. If the Company is found to have improperly classified the outages , Staff will recommend that the Company address previous E-38, REP related dockets, and any other affected submittals in order to properly classify the outage. Proper analysis relies on an outage classification being correct. Otherwise the planned outage criteria masks the root causal factor to the outage. Once the issue has been investigated in the IR 19-017 docket, Staff will issue a recommendation to the Commission, which will include this issue.

**<u>Municipal Street Lighting Installation and Maintenance</u>**

**Q. Does Staff have a recommendation regarding municipal street lighting installation and maintenance?**

**A.** Yes. Staff recommends that Eversource align its policy and tariff to allow its municipalities the opportunities to install and maintain its own streetlights through a private line contractor subject to special agreement with Eversource. This would align Eversource's policy and tariff on municipal street light installation and maintenance with Unitil's existing tariff and Liberty's proposed tariff in its current rate case Docket No. DE 19-064. The Company states it has considered and is amenable to such an arrangement, recognizing a number of conditions and concerns would need to be addressed. Please see Attachment KFD-18[33].

[32] Attachment KFD-17, Docket No. DE 19-017. Eversource Response to Staff 1-1
[33] Attachment KFD-18, Docket No. DE 19-057. Eversource Response to Staff 10-40

**Q. Does this conclude your testimony?**

**A.** Yes